

same as that of the geographical maps, the figures of geometry, and the musical characters."

The same author says further: "One of the branches in which the young Institution, in Boston, has made admirable progress, is beyond question, the printing of books and geographical charts in raised characters. . . . By diminishing the characters, a page 8 by 7 inches will contain 784 letters, while it will contain but 408 of the French characters and 509 of the 8 angular characters used in Edinburgh; as I had occasion to mention in my observations on the New York Institution. Seventy-six pages of the French books make a volume two and a half inches thick, while the same number by the Boston method make a volume of but one and a half inch."

In a letter from Dr. Allston, the Superintendent of one of the English Institutions for the Blind, to the government of the Boston Institution, dated June 18, 1836, is the following: "I received yesterday the maps, books, &c., for our Institution, for which I beg you to accept my most grateful acknowledgments. I have been earnestly at work upon them all the morning, and you could not have given me a greater pleasure than you have done. . . . I am delighted to think you are in such a fair way as to be so great a blessing to the blind. I pray God may spare you long to accomplish your great undertaking."

On page 149 we present the exact form and size of the type invented by Mr. Ruggles, and which are now used for printing for the blind; the face (or white part) of these letters being raised, in *their* books, about one-fortieth part of an inch above the surface of the paper.

It was never expected by Mr. Ruggles that his inventions for benefiting the blind would be of any great pecuniary value to the inventor, because of the very limited demand for everything used by them; but he has realized a large fortune from the sales of numerous patents and patent rights, granted him in this country and Europe, for a great variety of useful devices of the first importance in many of the industrial arts.

A Terrific Boiler Explosion.

The *Troy Times* has the following in reference to an explosion at a paper-mill in Schuylerville, Saratoga county, last week:—

"This explosion proves to be one of the most destructive boiler accidents that ever occurred in this vicinity. Indeed, we doubt if a parallel can be found to the eccentric and fearful course which the mass of iron, live coals, hot water and steam pursued on this occasion. Usually the explosive force is expended in an upward direction. This paper-mill boiler moved horizontally, with fearful velocity, passing like an iron-clad ram, or a combination of two hundred pound shot, through eleven buildings, wrecking them as completely as if an earthquake had toppled them over. The calamity took place at two o'clock on Saturday morning, when many of the structures were filled with slumbering occupants, all unconscious of danger; and it is really wonderful that scores of people were not killed and wounded. Thus far only two of the victims have died, but several others were injured.

"There were two large boilers in the paper-mill. A fireman, residing in Victory, took charge of the steam apparatus at midnight; receiving directions to allow the pressure to run down from one hundred and twenty-five to one hundred and ten pounds. At two o'clock, just as he had passed the mouth of the east boiler to attend to the other, the former exploded, knocking him down; the steam pouring across the spot where he had been standing a few moments before. The boiler, with a terrific report, started from its place in the mill, taking a northerly course, and passing through nine buildings, all of which, except the last, were demolished. The pecuniary damage by the calamity cannot be less than \$100,000."

TO WHOM IT CONCERNS.—Some master-builders and others, having asked bids for jobs of stone-work from different members of the Stone-cutter's Association of Cincinnati in cases where but one person could get the work, the members have felt compelled to charge a commission of one per cent. on all estimates, as a great deal of time is lost to the unsuccessful bidders. Where the bid is accepted no commission is charged.



Strength of Steam Boilers.

MESSRS. EDITORS:—On page 134, present volume of the *SCIENTIFIC AMERICAN*, you inserted a letter signed "T.W.B." disputing the correctness of the tables I sent you on the strength of steam boilers. (See page 71.)

Your correspondent says that "the error pervading the formula referred to, consists in taking the rings of the cylinder as of sufficient strength and stiffness to retain their shape if the continuity of the circle were cut." With all due deference to your correspondent, I beg to say that the tables were based on no such absurd theory, as we reckon the rivets have some little to do in assisting to keep the rings together, at the place where the continuity of the circle is cut." He also says that "the force to rend it asunder is as the semi-circumference and not as the diameter." To prove this as simply as I can, describe a circle on any given diameter, and from the centre draw radii, say one inch apart at the circumference; and we will suppose that each of these radii represents the steam pressing from the centre outwardly on the shell of the boiler. Now if we wish to tear the upper semicircle away from the lower one, it will be evident by looking at the figure, that as the radii recede from the perpendicular, their force is decreasing as a *lifting* power, and only act directly to tear asunder that part of the boiler to which they are at right angles. If, however, we raise perpendiculars an inch apart, from the diameter, we get the only correct number acting directly to tear the upper and lower semicircle apart; and so with any other semicircles in the boiler, showing that we must calculate from the diameter, and not from the circumference.

My object in sending you the tables was not so much for the purpose of correcting error—the principle being generally understood—as to give a simple and useful rule, by which any mechanic, who only knew how to work out a simple question in division, might be able to know something about the safe pressure to put on boilers, and so that he might feel perfectly safe by working within certain limits; whilst he would also know that by exceeding them life and property would be endangered. As, however, actual experiment has proved the correctness of the principle, my tables may be depended upon as being strictly within the limits of truth: and I therefore think your correspondent makes a bold and random assertion when he says: "The error thus noticed is general and has been (and may still be) the cause of numerous explosions."

WM. TOSHACH.

[We agree with this correspondent in his deductions and we inserted the letter alluded to in accordance with our principle to hear all sides.—Eds.
Schenectady, N. Y., Feb. 23, 1864.

Manufacture of Charcoal Iron in Baltimore.

MESSRS. EDITORS:—Messrs. Stickney & Co.'s Lazaretto Furnace, located at Lazaretto Point, opposite Fort Mc. Henry, Baltimore, is now producing an average of 40 tons of iron per week. The furnace is 9 feet diameter of bosh, and the hearth and in-walls are of Berry's premium fire-proof brick. It is worked with hot blast. The blowing cylinder is 45 inches in diameter with 5 feet stroke, and is driven by an engine with a 10-inch cylinder, 3 feet 6 inches stroke. There are also 7 kilns for burning charcoal, each 12x40 feet, and 18 feet high to the top of the crown, making a capacity for 60 cords of wood. The iron produced at this, as well as other furnaces in Baltimore, is all made with charcoal, from the Baltimore county ore, which has been pronounced by judges equal if not superior to the ore found in adjacent States. The Baltimore charcoal iron is used chiefly for rolling armor plates for our iron-clads.

JOHN GODFREY.

Baltimore, Md., Feb. 13, 1864.

THE *Paris Presse* computes the population of the world at one thousand millions, speaking three thousand and sixty-four languages, and having eleven hundred different forms of religion.

PROGRESS OF AMERICAN INVENTIONS ABROAD.

There is one thing that apparently never ceases; and that is the progress of Invention. Wars may interrupt commerce, society may be upheaved by radical changes, even the very face of the country itself may be, by storms or other causes, laid waste and desolate; in spite of all, Invention, the impersonation of a new order of things, steadily forces its way over every obstacle. To the remotest corners of the globe American genius has penetrated, and in countries long forgotten of the arts may now be heard the busy hum of our cotton machinery—may be seen the quick and economical steam engine; and in many other ways the might and energy of American ingenuity is made manifest. In spite of some adverse circumstances, such as the depreciation of the currency, and the existence of war, the productions and inventions of our countrymen meet with favor abroad; and instead of losing ground, they enjoy increased popularity. Our deductions on this point are drawn from observation; the proof of them is to be found in the appended list, which we publish in accordance with our promise to give the latest intelligence respecting valuable improvements in the mechanic and other arts and sciences, which have advanced the world so much:—

Application of Power to Steam Engines, &c.—Patentee: P. Dickson of Utica, and W. A. Jones, of Winona, Minnesota.

This invention consists in imparting rotary motion without the use of a crank, or having dead points to overcome. By the adoption of a series of dogs arranged to operate on the inner side of the rim of a wheel, a continuous rotation of a shaft or pulley is kept up. These dogs can be reversed by a simple arrangement without stopping the engine, so that the shaft or other part revolves in an opposite direction. The improvements also admit of varying the power exerted by the engine so that it may be increased or decreased, as desired. These are very important additions to the usefulness of the steam engine, and render it still more valuable.

Automatic Toy Figures.—Patentee: Enoch R. Morrison, of New York City.

The greatest excitement was caused by these little automata last winter, and they are still quite popular. By a train of clock-work motion is communicated to a pair of eccentrics which, being connected to a set of feet, cause the figures to which the clock-work is attached to move from place to place until the force of the spring is lost. These figures are neatly dressed and make a very handsome appearance.

Apparatus for Drying Grain.—Patentee: Peter C. Schuyler, of New York City.

This very much needed invention consists in arranging a number of sieves or gratings one above the other, inclined in opposite directions in such a manner that when the grain is carried to the top by an elevator, and a reciprocating movement is imparted to the sieves, the grain will run down from the highest to the lowest one. Currents of heated air pass through this shower of grain, and coming in contact with each kernel deprive it of moisture, rendering the produce fit for storage or transportation.

Machine for transmitting Power.—Patentee: J. F. Rochow, of Brooklyn, N. Y.

This patent relates to an improved method of transmitting power to steering or hoisting apparatus. The arrangement consists of two cog-wheels, having an equal or an unequal number of teeth, one firmly secured to the drum of a steering wheel, the other stationary. In combination with these wheels are pinions attached to a tumbling shaft so that by the rotation of the same through the action of the pinions and the differential wheels before spoken of, a slow rotary movement is imparted to the drum itself. Very great power is gained by this arrangement.

Projectiles and Fuses.—Patentee: Isaac P. Tice, of New York City.

This patent relates to an improved method of protecting fulminates of silver and mercury from explosion by careless handling, or accident; to this end small quantities of curled hair, wool, cotton or sawdust, are mixed with, or interposed between small quantities of the fulminate; also in lining the chamber of the shot containing the fulminate with cloth or cotton; also dividing the chamber into different compartments, whereby the force of concussion is reduced and danger of premature explosion from dropping

much lessened. Another part of this invention consists in constructing percussion fuses with a quantity of sand, or emery, locked up, or shut off from communication with the fulminate, so that the same is not in danger of explosion until the shot strikes the object aimed at. There is also an improved arrangement for preventing windage of the shot and obtaining rotary motion of the projectile through the gun, all of which are additions to the long list of improved projectiles for which the war has created a demand.

Sewing Machine.—Patentees: F. W. Grote and C. O. Tietjen, of New York City.

This invention consists in a novel device for extending the loops of the upper or needle thread on the under side of the material sewed and carrying the locking thread through them. Also in a novel construction of the feed apparatus; also an improved "take-up" for drawing up the slack of the loops of the upper thread through the cloth sewed. Also an improved arrangement of the tension; these several parts constitute a new and efficient sewing machine.

Attaching Metallic Eyelets to Cloth, &c.—Patentee: Charles E. Howard, of Bridgewater, Mass.

This invention relates to an improved method of applying and fixing metallic eyelets securely in cloth, leather, or other material. The machine is self-feeding, and by placing a number of eyelets in a box and working a treadle with the foot, the eyelets are delivered under a die which closes them over. All the motions are obtained from the treadle, and the work is most expeditiously performed. An engraving of this machine may be seen on page 33, Vol. VII. (new series) of the SCIENTIFIC AMERICAN; large quantities of them are now being made to order.

Boiler for pulping Vegetable Substances.—Patentees: W. F. Ladd, of Tarrytown, N. Y., and S. A. Walsh, of New York City.

In this improved apparatus the material to be reduced to pulp is treated either with or without alkali, and is at all times submerged in the liquor or solution employed in the boiling process. By an arrangement of a perforated diaphragm in the boiler the material is kept at a certain point while the liquor rises above it, and the heat is applied either by a coil of steam, or by a travelling furnace arranged to run back and forth under the boiler; this furnace can be removed when it becomes necessary to stop the boiling; the contents can then be discharged through a gate into any suitable receiver.

Projectiles for Ordnance.—Patentee: C. W. Stafford, of Burlington, Iowa.

This patent covers what is known as the "Stafford shot and shell," a projectile which is now much used in Government service. These shot and shell are steel bolts, solid for the shot and bored out for the shell, surrounded by a wooden casing to reduce windage, and obtain increased velocity of the bolt by having a small punching area, combined with a large superficial area exposed to the action of the charge. There is also a peculiar flange at the base which is packed with twine or hemp and saturated with talow. This prevents windage and, in connection with the flange, causes the shot to rotate in the bore of the rifle. An engraving of these shot and shell can be seen on page 209, Vol. VIII. (new series) of the SCIENTIFIC AMERICAN.

Obtaining Printing Surfaces, Dies and Substitutes for Photographic Negatives.—Patentees: Paul Schulze, and Frederick W. Billing, of Brooklyn, N. Y.

The object of this invention is to procure a cheap substitute for wood engraving, so that by the aid of the electrotype process surfaces can be obtained which may be printed from. To this end a composition of various substances is employed which may be coated on glass, metal, or precious stones, and by subsequent processes, such as washing, being submitted to the action of acids, etc., the drawing is brought out in relief or the design is sunk in the material worked as may be desired without cutting any of the design by hand. Processes of this nature are exciting much interest at this time, and it is believed that ere long the costly and slow labor of wood engraving will be superseded by quicker and cheaper methods.

Machinery for cutting Corks.—Patentee: Isaac Goodspeed, of Norwich, Conn.

This ingenious invention relates to an improved means of cutting bottle or other corks out of slabs of

the same, either cylindrical or of any desired taper. This is done by the use of changeable patterns attached to the spindle carrying the cutters. The cutters are applied to the spindle so that they have a motion lengthwise, while they and the pattern also have a rotary motion given by the carrying spindle. By using double patterns, so that the cutters are held at different distances from the carrying spindle, a shell or ring-shaped cork may be cut without waste as the centre cork can be used for a stopper also. There are also ingenious arrangements for adjusting the cork-bark and holding it while worked upon, which renders this machine a most useful one.

MISCELLANEOUS SUMMARY.

STATISTICS OF ARDENT SPIRIT MANUFACTURE.—The total value of all kinds of distilled liquors made in the United States in 1860, was \$24,243,171. The State of New York stands first of all the States as the manufacturer of whiskey, highwines and alcohol. Illinois stands next and Ohio next. Kentucky, where all the "Bourbon" is supposed to come from, makes but 3,000,000 gallons of whiskey, highwines and alcohol. The whole country produces less than 3,500,000 gallons of gin and brandy per annum, and about 4,000,000 gallons of what is called New England rum. The total value of malt liquors manufactured in the country, in 1860, was \$18,001,125. New York manufactures more malt liquors than any other State; Pennsylvania stands next, Ohio and California are the great wine-producing States as yet; the former producing, in 1860, 562,640 gallons, and the latter 494,516 gallons.

A PHILADELPHIA exchange represents that the coal companies are busily enlarging their facilities in every direction, and that the product of coal in 1864 will be greatly increased. The article concludes thus:—"Not only Pennsylvania capitalists, but those of New England and New York, are actively engaged in the enterprise. The price of coal must fall." [No doubt it will, in summer, when no one wants it.—Eds.]

A TERRIBLE accident lately occurred in St. Louis, at the launch of an iron-clad. The vessel went off the ways suddenly, and the anchor being thrown over, several persons were caught in the coils of the chain attached to it and drawn overboard. Only one of them, however, was drowned.

ANOTHER death from inhaling nitrous oxide gas, recently occurred in Vermont. The victim was a young girl, seventeen years of age, remarkably robust in constitution and health. Deaths from the employment of this agent seem to be multiplying rapidly.

APPLICATIONS have been filed with the Controller of the Treasury Department for 215 National Banks. This new system of banking is becoming very popular; and at the rate it is progressing, it must soon altogether supplant the State system.

MR. G. LEVERICH, of Trenton, N. J., is the agent, simply, of Powers's Rifling Machine, recently illustrated in the SCIENTIFIC AMERICAN (page 113), and not "sole agent and maker," as therein stated.

A LARGE fire which recently occurred in Gloucester, Mass., was only checked by the timely arrival of a steam fire-engine; the hand-engines being frozen up and disabled.

\$15,000,000 worth of gold dust, it is reported, is now in Idaho territory, awaiting transportation to the States.

FOUR "blockade-runners" were recently destroyed off the coast of Florida and North Carolina, by the *Sassacus*, a new naval vessel.

ENGINEERS desirous of entering the Volunteer Navy may apply immediately, in person, to the Chief Engineer of the Yard.

The Iron Propeller "Havanna."

Messrs. Neafie & Levy, of Philadelphia, Pa., are now building a large iron propeller of 1,336 tons; the length of the vessel is 240 feet, breadth of beam 34 feet, and depth of hold to spar deck 22 feet; draft of water at load line, 15 feet 6 inches. The frame is constructed of wrought-iron plates, 7-8ths and 1-16th thickness on an average, and is fastened with 3-4th rivets 2½ inches apart; the floors are shaped something like the letters Z and an inverted L, and are molded 4 inches, sided half an inch. The frames are 18 inches apart at centers. There are also three

water-tight bulkheads, and the beam-ties on the spar deck are of wrought-iron plates.

The ship is to be driven by one of Mr. John Baird's engines, having a vertical cylinder of 60 inches diameter, and 5 feet stroke of piston. There are two tubular boilers in the hold, having water bottoms and lagged with felt. The propeller is cast-iron, is four-bladed, and is 15 feet in diameter. The ship is built according to the most approved principles, and is expected to be creditable to all concerned in her construction.

RECENT SOUTHERN INTELLIGENCE.

Since our last issue we are in receipt of a file of Richmond and North Carolina papers, from which we select the following items:—

Gold is quoted by the Richmond *Examiner* at twenty-two hundred per cent premium and silver at nineteen hundred. One hundred dollars in gold will buy \$2,200 of Confederate Seven-per-cent Bonds!

THE bakers have increased the price of baker's loaves from fifty cents to one dollar; and at the same time, decreased the bulk and weight to about half the former size. Flour in Richmond is \$250 per barrel, sugar \$7 to \$8 per lb.

THE Richmond quotations of prices current go all over the Confederacy; and in a great measure regulate the value of produce everywhere. If flour goes up in Richmond any day ten dollars a barrel, it will go up in Buchanan the next day about the same amount; although, but for the Richmond rise, the price in Buchanan might have remained stationary for six months. The case is the same with all commodities, including money. Distance and circumstance may modify the proposition as to particular localities; but, as a general rule, the market quotations at a great centre of commercial operations and intelligence like Richmond, exert a controlling influence over prices throughout the Confederacy."

A DOZEN cases of runaway slaves are almost daily reported to the police. The abscondings of slaves are increasing in number and frequency, and the owners of such migratory and uncertain property must look to their whereabouts."

RICHMOND is the Southern 'Mecca,' and everybody a pilgrim, it would seem. The hotels are full; the boarding-houses are overflowing. There is nothing to eat and not a room for rent, yet everybody has a contented stomach and a couch to stretch himself upon. It has, ever since the war, been a mystery what important business brings everybody and his kin to Richmond. One would suppose the stupendous price of living would drive them away or hurry them back, if they must come. On the contrary it woos them, and foolish people rush into Richmond like crazy craft into the vortex of a maelstrom. What it is they find so attractive in Richmond is an inexplicable puzzle to sensible, plodding folks. It may be for the experience of the indescribable sensation of living at the rate of twenty or fifty dollars per day at the hotels; of drinking 'blue ruin' at the rate of two dollars at the restaurants; of being pulled up every half-hour by the 'conscript hawk' or driven distracted by the music of the iron keys of the Jeff. Davis pianos; or being robbed once in every twenty-four hours, with the nightly chance of a knock-down or a tumble into the Basin. If these are not the attractions, our query 'What brings so many idle people to Richmond?' is still unsolved."

MANY of the fattest and bravest men in the Confederacy are afraid to go into the army lest they should be unwieldy or incapable of rendering service. This is a mistake. Some exceedingly fat men are now in the service. Gen. Humphrey Marshall served for two years. But to set the matter at rest, we need only cite the example of Chapiin Vitelli, one of the ablest generals who accompanied Ava to the Netherlands. Stroda says of him: 'He was equally distinguished for his courage, his cruelty and his corpulence. The last characteristic was so remarkable that he was almost monstrous in his personal appearance. His protuberant stomach was always supported in a bandage suspended from his neck; yet, in spite of this enormous impediment, he was personally active on the battle-field, and performed more service, not only as commander but as subaltern, than many younger and lighter men.' Be of good cheer, therefore, fat men; procure your bandages, and go in!"